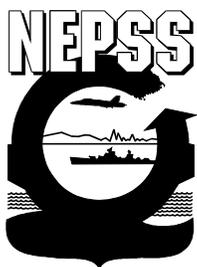




Marine Environmental Update



EPA Announces Proposed Revisions Of Water Quality Standards

On July 7, 1998, the Environmental Protection Agency issued an Advance Notice of Proposed Rule Making (ANPRM) seeking comments from interested parties on possible revisions to the Water Quality Standards Regulation at 40 CFR Part 131. Three areas in which the EPA is considering making changes to the Water Quality Standards Regulations are: a) designated uses and use attainability requirements; b) biological criteria; and c) mixing zones.

Designated Uses

These are defined as those uses specified in water quality standards for each water body or segment whether or not they are being attained. State and Tribal use classifications generally do not reflect the variability among aquatic community types and may list, instead, very general descriptions such as "aquatic life" as the designated use. It is possible that the measurable changes in aquatic community composition or production could occur at a specific site and still satisfy the definition of "aquatic life." Lack of precision in the description or designation of the use could result in under protection of the resource, unless somewhere in the State or Tribal process an intended level of protection is satisfied.

The EPA supports broad application of state-wide or tribe-wide criteria to ensure that sensitive uses are protected where site-specific information is lacking. However, the EPA's current thinking is that there is a growing need to more precisely tailor use

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descriptions and criteria to match site-specific conditions, ensuring that uses and criteria provide an appropriate level of protection, which, to the extent possible, is neither over nor under protective. A more precise, appropriately tailored use description may be accompanied by more focused criteria. The EPA is considering whether or not the current regulations and guidance provide the framework needed to strike the appropriate balance between specificity sufficient to ensure uses are appropriately protected and the flexibility needed to allow efficient widespread application of a classification system to all State or Tribal waters. When and how to refine these uses are also being considered.

The phrase "fishable/swimmable" used by the EPA has caused much confusion in the past, especially for water bodies that do not host commercial or sport fisheries. The EPA will not approve State or Tribal action to exclude aquatic life protection based on the conclusion that a water body does not support a sport or commercial fishery. The term "aquatic life" would more accurately reflect the protection of the aquatic community that was intended in Section 101(a)(2) of the Clean Water Act.

One other issue raised has to do with refined "designated use." A proposal to refine use categories will have to be accompanied by a rationale explaining how it was determined that the proposed biological description appropriately reflects the potential for those waters to which the new sub-classification is to be applied. This can then serve as the basis for deriving defensible and appropriate criteria specific to the new sub-classifications.

Biological Criteria

Biological criteria are narrative descriptions or numerical values that describe the reference condition of the aquatic biota inhabiting waters with a designated aquatic life use. A draft discussion document on implementation of biological criteria by States and Tribes sets forth a step-wise approach to biological criteria development and adoption in Water Quality Standards:

1. establishment of a long term goal to restore and maintain biological integrity of State or Tribal surface waters where determined feasible;
2. implementation plan for development of biological criteria for specific water body types, including time frame;
3. development of standardized biological assessment methods, regional reference conditions, and biological database to support refinement of designated aquatic life uses and development of biological criteria;
4. adoption of narrative biological criteria into water quality standards; and
5. adoption of quantitatively-based biological criteria in water quality standards.

The EPA is evaluating options for adoption of quantitatively-based biological criteria that would result in a consistent translation of narrative biological criteria into numeric criteria. There are two proposed definitions for this term: a) a narrative statement adopted into State or Tribal water quality standards that describes specific designated aquatic life uses and cites technical procedures existing outside of regulation; or b) a narrative statement as above plus adoption of the technical procedures or the actual

numeric biological criteria in State or Tribal water quality standards. The EPA is considering whether or not to require States and Tribes to adopt a narrative criteria or a numeric criteria or both and what the penalty would be if a State or Tribe fails to adopt it. The EPA is considering the following tentative time frames for adoption of biological criteria in water quality programs:

- narrative biological criteria for streams and an implementation plan for development of quantitatively-based biological criteria for streams in the 2000-2003 Water Quality Standards; and
- narrative biological criteria and an implementation plan for development of quantitatively-based biological criteria for other applicable water body types (lakes, reservoirs, estuaries, near coastal waters, large rivers and wetlands) within ten years following EPA publication of technical guidance.

The role that biological criteria and assessment will play in helping to identify specific stressors or sources of impairment will need to be carefully defined. The approach to evaluate impairment must also be practical and effective.

Mixing Zones

Current policy addresses mixing zones as "allocated impact zones" where certain numeric water quality criteria may be exceeded as long as there is no lethality to organisms passing through the mixing zone; there are no significant human health risks; and the designated and existing uses of the water body are not impaired as a result. The generality of current regulation has led to some uncertainty as to what constitutes an approvable mixing zone policy. The EPA is considering changing the language regarding State and Tribal adoption of mixing zone policies to address specifically the content of such policies, such as requiring States and Tribes to explicitly indicate in their water quality standards whether or not they allow mixing zones for each of the various uses designated for a given water body. States and Tribes could also be required to specify the conditions under which mixing zones are allowed in each site-specific application and the limitations to those applications (*e.g.*, size, shape, length, placement). The EPA is also looking at requiring mixing zone policies to address the following elements:

- identify conditions and circumstances when mixing zones are not permitted;
- identify any pollutants or classes of pollutants for which mixing zones are prohibited;
- identify the mechanisms to be used to ensure that mixing zones do not impinge on ecologically or recreationally sensitive areas;
- identify the mechanisms to be used to determine complete and incomplete mixing of effluent and receiving water;
- identify conditions when a mixing analysis is required;
- identify default design flows for implementing criteria;

- identify maximum allowable mixing zone size and configuration; as well as how mixing zone dimensions are determined;
- specify what water quality conditions must be met within mixing zones;
- state whether zones of initial dilution are allowed; and
- state whether there are special conditions established for bioaccumulative pollutants.

The EPA is also considering the need for additional language in the water quality standards regulation to clarify the essential elements of State and Tribal mixing zone provisions and whether such language would be better established in guidance.

Thought is also being given to the issue of incomplete mixing which results in plumes. States and Tribes may have to specify procedures and decision criteria for evaluating complete and incomplete mixing and design different mixing zone/dilution procedures for incomplete and complete mixing situations. Lastly, much consideration is being given to the question of whether or not mixing zones for bioaccumulative pollutants should be prohibited and what circumstances would designate them as prohibited. Whether or not such prohibitions will be addressed on a basin- or body- specific basis and whether or not the EPA should allow for any exceptions to such prohibitions are also areas of concentration.

Written comments must be submitted by midnight January 4, 1999. Send written comments to W-98-01, WQS-ANPRM Comment Clerk, Water Docket, MC 4101, US EPA, 401 M Street, S.W., Washington, D.C. 20460. Comments may also be submitted electronically to OW-Docket@epamail.epa.gov. For access to docket materials, please call (202) 260-3027 to schedule an appointment. For further information contact Rob Wood at USEPA Standards and Applied Science Division (4305), 401 M Street SW, Washington, DC 20460, e-mail: wood.robert@epa.gov, telephone: 202-260-9536. The complete text of the ANPRM is available from MESO at: (<http://environ.spawar.navy.mil/Programs/MESO/Newsltr>).

Federal Register, Volume 63, Number 129, July 7, 1998, pp. 36471-36806.

EPA Releases TMDL Committee Final Report

The Total Daily Maximum Load (TMDL) Federal Advisory Committee (FACA) appointed by the Administrator of the Environmental Protection Agency held their final meeting on May 4-6, 1998 (see *Marine Environmental Update*, Vol. FY98, No. 3). The TMDL program has three main goals: (1) to restore impaired water bodies; (2) to implement these limits once established; and (3) to communicate with the public about these limits. The Committee considered the identification of impaired waters for which states must develop TMDLs. States normally use monitoring data to decide if a water body is impaired or not, but the Committee says that may not be comprehensive enough to provide adequate

information and in some cases cannot address certain types of impairments like loss of habitat. Specific recommendations of the Committee are summarized below.

Identifying Impaired Waters/Listing

- Waters for which non-attainment is suspected but cannot be determined because more or higher quality data are needed should be identified by States and given high priority for additional monitoring.
- Waters are to be listed under §303(d)(1) if they show non-attainment with water quality standards, including numeric and/or narrative criteria and/or existing or designated beneficial uses.
- Waters should be de-listed (removed from the §303(d)(1) list) when they attain water quality standards or new information shows that the original basis for listing was inaccurate.
- Threatened waters expected to move from attainment to non-attainment with standards over the next two years should be placed on a discrete list for focused attention to prevent impairment.

Implications of Being Listed

- Until a TMDL is completed, States must implement the current NPDES regulatory restrictions against permitting new point source discharges that will cause or contribute to the impairment; however, State/stakeholder-developed stabilization plans may offer flexibility if parameter-specific net progress toward attaining standards is demonstrated.

Pace and Scheduling of TMDL Development

- EPA regulations should provide that all TMDLs must be completed expeditiously but no later than 8 to 15 years after listing. EPA regulations should also provide that, generally, high priority TMDLs be completed within five years after listing.
- The EPA should require by regulation that each State prepare a schedule for developing TMDLs for all listed waters. EPA should issue guidance describing factors that may be used to determine the order and pace for completing TMDLs. State workplans for completing TMDLs must show a reasonably proportionate effort over time (*e.g.*, must not delay work on TMDLs to the end of the State's schedule for completing them).

Development of TMDLs

- To achieve water quality standards, the TMDL development/implementation planning process must produce seven components: 1) target identification; 2) identification of needed pollution reduction; 3) source identification; 4) allocation of pollution loads; 5) implementation plan; 6) monitoring and evaluation; and 7) procedures for any needed revision based on evaluation.

- In developing TMDLs, States and the EPA must use the highest degree of quantitative analytical rigor available. A reasonable minimum amount of reliable data is always needed. Decisions and assumptions based on best professional judgment must be well-documented. TMDLs for which a high degree of quantitative analytical rigor is not possible in target identification and/or load allocation should contain relatively more rigor or detail in their implementation plans, including provisions for follow-up evaluation and potential revision based on the evaluation.
- In some instances, TMDLs may include surrogate measures and measures other than daily loads. These alternative measures must be protective of the water quality standard, and address the effects of the pollution causing non-attainment.
- The EPA should revise its regulations to include basic principles for defining the geographic scope of TMDLs under various circumstances.

Implementation

- The EPA should issue regulations requiring that an implementation plan be prepared for and submitted concurrently with each TMDL. Among other things, the implementation plan would describe control actions to be taken, the schedule for implementing those control actions, and reasonable assurances that load allocations will be met. The plan would also establish a follow-up monitoring and evaluation regime and a process for making any needed revisions based on the evaluation.
- In addressing point sources, States and/or the EPA must set schedules for NPDES permit revisions to wasteload allocations. In addressing nonpoint sources, States must identify the management practices and measures to reduce, to the maximum extent practicable, the level of pollution they contribute. The EPA must assure that the combination of point and nonpoint controls/measures is designed to attain water quality standards.

Allocations

- States have discretion in allocating pollution loads among sources as long as the allocations will meet TMDL targets, but the EPA should provide guidance on appropriate principles and information on workable approaches to assist States.
- The EPA and/or States should ensure that future growth is considered in all allocation decisions, and that allocation decisions based on future growth, as well as the implications of these decisions, are well-documented.
- The EPA should encourage States to allocate pollution reduction responsibilities equitably within a watershed framework. States may consider such factors as cost-effectiveness, technical and programmatic feasibility, relative source contributions, and certainty of implementation.

Special Challenges

- Waters impaired wholly or partly by extremely difficult historic problems are to be identified under §303(d)(1). TMDLs for these waters should provide for reasonable reductions from existing sources to the extent they can help achieve attainment, may allow a longer time for attainment than other TMDLs, and are expected to require creative solutions.
- The EPA should conduct and encourage more research into the causes and solutions for waterbody impairments due to atmospheric deposition.
- Waters impaired wholly or partly by modifications to flow are to be identified under §303(d)(1). Federal agencies should help solve flow-related non-attainment problems within their jurisdiction. The EPA should provide assistance and information to States on addressing flow issues in TMDLs.

Public Communications

- Two-way communication with stakeholders, including the general public, is a critical element of a successful TMDL program. States and the EPA should actively solicit citizen comments, consider citizen-nominated waters for §303(d)(1) listing, encourage citizen monitoring, and distribute educational materials to stimulate public interest/involvement in watershed restoration and protection.

Stakeholder Involvement

- States and the EPA should encourage and help stakeholders play an active role in supporting TMDL development. States (and the EPA, for any TMDLs for which it is responsible) should have written agreements with stakeholders who will play a substantial role in TMDL development, including funding and participation in data collection and analysis. States and the EPA cannot delegate their legal responsibility to ensure the adequacy of TMDLs and public participation processes and should be involved in stakeholder efforts to support TMDL development.

Program/Agency Cooperation

- States should cooperate with each other and with Tribes to resolve shared water quality problems, with EPA stepping in as necessary to address multi-jurisdictional problems.
- The EPA should ensure that programs under the Clean Water Act, the Clean Air Act, CERCLA, RCRA, FIFRA, and its other authorizing statutes, are coordinated and implemented effectively to ensure attainment of water quality standards.
- Federal agencies should work cooperatively and proactively with the EPA and States and must engage in all appropriate activities with respect to attainment of State water quality standards and other Clean Water Act requirements.

Federal/State/Tribal Capacity

- A national dialogue at high policy levels is needed to increase support for and commitment to restoring impaired waters.
- The EPA needs to strengthen its technical guidance and support to improve program efficiency and State capacity to develop effective TMDLs.
- Additional investments and/or reprogrammings of resources are needed to increase EPA, State, and federal land management agency TMDL efforts, including efforts to improve State and federal monitoring programs.
- The EPA should support State and Tribal TMDL program capacity-building efforts by, among other things, providing sound analytical tools and methods to assess resource/staffing needs.

The complete text of the TMDL FACA report can be found at <http://www.epa.gov/owow/tmdl/faca> or at the MESO WWW site (<http://environ.spawar.navy.mil/Programs/MESO/Newsltr>).

EPA National Advisory Council for Environmental Policy and Technology, Report of the Federal Advisory Committee on the Total Maximum Daily Load (TMDL) Program, EPA-100-R-98-006, July, 1998.

EPA Strategy For The Development Of Regional Nutrient Criteria

The Clean Water Action Plan (see *Marine Environmental Update*, Vol. FY98, No. 1) calls for the Environmental Protection Agency to accelerate the development of scientific information concerning the levels of nutrients that cause water quality problems and to organize this information by different types of waterbodies (*e.g.* streams, lakes, coastal waters, wetlands) and by geographic regions of the country. The EPA is also to work with States and Tribes to adopt criteria (*i.e.* numeric concentration levels) for nutrients, including nitrogen and phosphorus, as part of enforceable State water quality standards under the Clean Water Act.

The National Strategy for Development of Nutrient Criteria proposes to build on the work accomplished to date and to establish an objective, scientifically sound basis for assessing nutrient over-enrichment problems. This in turn will provide critical support for expanded efforts to control nutrient levels in waters and meet the Nation's clean water goals. Specifically, this strategy proposes a two-phase process for the development of water quality standards for nutrients:

1. The EPA will develop "nutrient criteria guidance" for nitrogen, phosphorus, and other nutrient parameters and will express nutrient criteria guidance as numerical ranges, reflecting a menu of different values based on the type of waterbody (*i.e.*, streams and rivers, coastal waters and

estuaries, lakes and reservoirs, and wetlands) and the region of the country in which the water is located.

2. The EPA expects States and Tribes to adopt nutrient water quality criteria (including N and P concentration levels) to support designated uses of waters based on EPA's nutrient criteria guidance or other scientifically defensible methods and incorporate them into the States' water quality standards. The target date for adoption of nutrient criteria as part of water quality standards is within three years of completion of the guidance, (*i.e.*, by the end of the calendar year 2003).

The key elements of the strategy are: 1) Geographic Region Approach, 2) Waterbody-Type Technical Guidance, 3) Nutrient Criteria and Standards Development, 4) Nutrient Teams, and 5) Management and Evaluation.

Geographic Region Approach

The EPA intends to develop nutrient criteria guidance on a regional, rather than a national, basis. Regional criteria information will be presented for four categories of waterbodies. Upon determination of the best eco-region scale, the next task, which is integral to the development of nutrient eco-regional ranges, is the identification of reference conditions within each of the nutrient eco-regions. Reference conditions refer to information from relatively undisturbed areas within each eco-region. The concept of reference conditions and how they are selected will be described in more detail in the technical guidance documents.

Waterbody-Type Technical Guidance

A major element of this strategy will be the technical nutrient criteria guidance manuals, which will provide methodologies for developing region-specific nutrient criteria by waterbody type: a) streams and rivers; b) lakes and reservoirs, estuaries and coastal marine waters; and c) wetlands.

The EPA plans to publish guidance documents for streams and rivers, and lakes and reservoirs in 1999; a guidance document on estuaries and coastal marine waters in 2000; and a guidance document on wetlands in 2001. In each document, where data is available, the EPA will also provide target regional nutrient ranges for phosphorus and nitrogen (and potentially other parameters), which States and Tribes may elect to use as the basis of their nutrient criteria and standards in lieu of applying the methodology in the guidance documents. States may also use these values as the basis for TMDLs and NPDES permit limits.

As a preliminary measure for development of these nutrient criteria, the EPA is seeking the cooperation of States and Tribes to pool available information in the determination of such ranges of target values for each region of the country. The EPA will initially develop ranges for phosphorus, nitrogen, chlorophyll and secchi depth. An essential element of this process is the determination of the natural, background

rophic state representative (reference condition) of that area and waterbody so that abatement management can be directed at the eutrophication of concern.

Nutrient Criteria and Standards Development

Upon completion of all the waterbody-type guidance documents, the EPA expects all States and Tribes to adopt and implement numerical nutrient criteria into their water quality standards within three years of publication of waterbody-type guidance documents, and to complete adoption of nutrient criteria for all waterbodies in the State by no later than December 31, 2003. With regard to criteria and standards development, State and Tribes may choose to use the following approaches:

- The EPA target ranges, or values within those ranges, can be directly adopted by the States or Tribes as their criteria and standards and used to interpret narrative standards.
- The States or Tribes can use the EPA target ranges together with their own databases to develop their own criteria or to evaluate the protectiveness of any numerical nutrient criteria they may already have.
- States or Tribes may elect to use the EPA methodology described in waterbody-type guidance to develop criteria or employ their own approach, independent of the ranges, as long as it is scientifically defensible.

Nutrient Teams

The overall national nutrient criteria project will be managed by a National Nutrient Team. The EPA National Nutrient Team will include staff from the Office of Water, a Coordinator from each EPA Region, State/Tribal representatives, and representatives of other Federal agencies. The Regional Coordinator will promote the development and implementation of State and Tribal projects, databases, and nutrient criteria and standards, as well as manage the award of financial assistance to support this endeavor. Ultimately, the Regional Coordinators and National Team will work together to develop nutrient ranges for each eco-region wherever appropriate data is available.

Management and Evaluation

The reduction of nutrient over-enrichment is a management process which must integrate a number of programs and methods including, but not limited to: Nonpoint and Watershed programs; NPDES Permitting program; and Biosolids Management program. There are some fundamental management concepts that should apply in most of these situations, such as: a) problem identification; b) background investigation; c) data gathering, d) identification of key problem areas, e) alternative management options, f) detailed management plan, g) implementation and communication; h) monitoring and periodic review; I) completion and evaluation; and j) continued monitoring and maintenance.

The databases and monitoring systems developed, together with the derived criteria, should then be used by the EPA, States and Tribes to assess actual management progress toward ameliorating over-enrichment conditions.

The *National Strategy for the Development of Regional Nutrient Criteria* can be obtained in its entirety from the MESO WWW site (<http://environ.spawar.navy.mil/Programs/MESO/Newsltr>) or from the EPA at <http://www.epa.gov/OST/Rules>.

Environmental Protection Agency, National Strategy for the Development of Regional Nutrient Criteria, EPA 822-R-98-002, Office of Water, June 1998, 47 pp.

EPA Draft Revisions To Methodology For Deriving AWQC For Protection Of Human Health

The Environmental Protection Agency announced the availability for public comment of draft revisions to the Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health ("AWQC Methodology Revisions") published pursuant to Section 304(a)(1) of the Clean Water Act (CWA). These AWQC Methodology Revisions, once finalized, will supersede the existing Guidelines and Methodology Used in the Preparation of Health Effect Assessment Chapters of the Consent Decree Water Criteria Documents ("1980 AWQC National Guidelines"), published by the EPA in November 1980 (45 FR 79347, Appendix C). This document is intended to satisfy the requirements of Section 304(a)(1) of the CWA that states that the EPA should periodically revise criteria for water quality to accurately reflect the latest scientific knowledge on the kind and extent of all identifiable effects on health and welfare that may be expected from the presence of pollutants in any body of water, including ground water.

These AWQC Methodology Revisions are necessitated by the many significant scientific advances that have occurred during the past 18 years in such key areas as cancer and non-cancer risk assessments, exposure assessments, and bioaccumulation. These revisions are not regulations and do not impose legally-binding requirements on the EPA, States, Territories, Tribes, or the public. Also published as part of this document are draft AWQC criteria document summaries for three contaminants that reflect the Draft AWQC Methodology Revisions. The EPA will accept public comments on the Draft AWQC Methodology Revisions on or before December 14, 1998. Comments postmarked after this date may not be considered.

Copies of the technical support document and the three complete criteria documents cited in this document may be obtained from the U.S. EPA National Center for Environmental Publications and Information (NCEPI), 11029 Kenwood Road, Cincinnati, OH 45242 or (513) 489-8190. The document is

also available in PDF format from MESO at <http://environ.spawar.navy.mil/Programs/MESO/Newsltr>. For further information contact Denis Borum (4304), USEPA, 401 M St. S.W., Washington, D.C. 20460, telephone: (202) 260-8996.

Federal Register, Volume 63, Number 157, August 14, 1998, pp. 43755-43828.

OPNAVINST 5090.1B CHANGE 2 Drafted

The Navy Environmental Protection, Safety and Occupational Health Division of the Office of the Chief of Naval Operations (OPNAV N45) is currently revising the Navy Environmental And Natural Resources Program Manual (OPNAVINST 5090.1B). The CHANGE 2 draft, dated September 1, 1998, affects Chapters 1, Environmental Policy, Organization and Funding; 2, Procedures for Implementing the National Environmental Policy Act (NEPA); 9, Oil Management Ashore; 10 Oil and Hazardous Substances Contingency Planning; 15, Installation Restoration; 16, Storage Tanks; 19, Environmental Compliance Afloat; 20, Environmental Quality Assessment Ashore; 22, Natural Resources Management; and 27, Natural Resources Damages; and several appendices. The previous version of the manual (OPNAVINST 5090.1B CH-1) was released February 2, 1998. The OPNAVINST 5090.1B CH-2 draft can be accessed at <http://206.5.146.100/n45/doc/navydocs/> (MILITARY PERSONNEL ONLY - a password request form is provided).

Navy Supports Southern California Regional Survey Efforts

The Southern California Bight, an open embayment along the coast between Point Conception and Cape Colnett (south of Ensenada), Baja California, represents an important and unique ecological resource. Local, state, and federal agencies spend over \$10M yearly to monitor the environmental quality of natural resources in the Bight. Most of this monitoring is associated with National Pollutant Discharge Elimination System (NPDES) permits and is intended to assess compliance of waste discharge with the California Ocean Plan and the Federal Clean Water Act, which set water quality standards for effluents and receiving waters.

While these monitoring programs have provided important information, they were designed to evaluate impacts near individual discharges. To develop management strategies for the entire Bight, environmental planners need regionally-based information to assess cumulative impacts of contaminant inputs and to evaluate relative risk among different types of stresses. Existing monitoring data are limited to specific geographic areas, but there is little or no data for the areas in between.

The Southern California Bight 1998 Regional Monitoring Project (Bight '98) is a continuation of the successful cooperative regional-scale monitoring begun in southern California in 1994 during the Southern California Bight Pilot Project (SCBPP). The SCBPP included measurements of chemistry, toxicity, benthic infauna, and fish assemblages at 261 sites between Point Conception and the Mexican border. Assessments were made of water quality, sediment contamination, the status of biological resources and species diversity, and the presence of marine debris. Benefits derived from the SCBPP included the development of new useful technical tools that could only be developed with regional data sets and participation by multiple organizations.

Bight '98 builds upon the previous successes and expands on the 1994 survey by including more participants, sampling more habitats, and measuring more parameters. Fifty-four organizations, including international and volunteer organizations, have agreed to participate. Cooperative interactions among many organizations with different perspectives and interests, including a combination of regulators and dischargers, ensures that an appropriate set of regional-scale questions will be addressed by the study.

The additional resources brought by new participants also expands the number of habitats and indicators that will be sampled. Sampling for Bight '98 will include all of the areas sampled in 1994, plus a new focus on nearshore habitats (bays, harbors and beaches) and offshore islands. Bight '98 will also coordinate with a Mexican program to characterize the condition of Bight coastal waters south of the US border. The new indicators that will be measured include shoreline microbiology, biomarkers and new chemical measures.

The Bight '98 Survey is organized into three technical components: 1) Coastal Ecology, 2) Shoreline Microbiology, and 3) Water Quality.



Personnel assigned to the Space and Naval Warfare Systems Center, San Diego, performing benthic fish and invertebrate sampling operations from the R/V ECOS in support the Bight '98 survey, 20 August 1998 (U.S. Navy photograph).

The overall goal of the coastal ecology component of Bight '98 is to assess the condition of the bottom environment and the health of the biological resources in the Bight. To accomplish this goal, Bight '98 will focus on four objectives:

1. Estimate the extent and magnitude of ecological change in the Bight;
2. Compare conditions among selected geographic regions of the Bight;
3. Assess the relationship between biological responses and contaminant exposure; and
4. Describe historical trends at selected sites.

The overall goal of the shoreline microbiology component of Bight '98 is to assess the microbiological water quality of the southern California recreational shoreline. Four objectives will be addressed to accomplish this goal:

1. Determine the extent of shoreline meeting bacterial water quality standards;
2. Compare indicator bacteria levels among different types of shoreline;
3. Compare the response yielded by different indicator bacteria; and
4. Assess the association between runoff and water borne human enteric virus.

The Navy is participating in the sampling and trawling processes, and also conducting QwikLite toxicity assays and comet assays (fish DNA damage assessment) for bottom organism health assessments. Personnel located at the Space and Naval Warfare Systems Center, San Diego (SSC SD), Environmental Sciences Division, serve on several Steering and Technical Committees: Jeff Grovhoug, SSC SD D362, has been chosen as a Regional Monitoring Steering Committee Member. The Navy is also participating in the Field Methods and Logistics Committee, the Information Management Committee, the Toxicology Committee and the Water Quality Committee. The Navy efforts are being supported through funding from COMNAVBASE SAN DIEGO,



Benthic fish and invertebrate sample sorting operation, 20 August 1998 (U.S. Navy photograph).

CNO (N457) and CINCPACFLT. Benthic fish and invertebrate surveys were conducted in San Diego Bay and Los Angeles/Long Beach Harbor areas by the Navy using the R/V *ECOS*, a specially-designed 40-foot craft incorporating real-time chemical, physical and biological parameter mapping (see *Marine Environmental Update*, Vol. FY97, No.3).

More information can be found at the Southern California Coastal Water Research Project WWW site (<http://www.sccwrp.org>) or by contacting Jeff Grovhoug, Marine Environmental Quality Branch, Space and Naval Warfare Systems Center, 53475 Strothe Road, San Diego, CA, 92122-6310, telephone (619) 553-2773, DSN 553-2773, e-mail d362@spawar.navy.mil.

QwikLite Bioassay Approved As ASTM Standard

In December 1997, the American Society for Testing and Materials (ASTM) approved QwikLite as a rapid bioassay standard. The *Standard Guide for Conducting Toxicity Tests with Bioluminescent Dinoflagellates* (E 1924-97) is scheduled to be available from ASTM by the end of 1998, and the system itself is being developed under a non-exclusive license for purchase by Ocean Test Equipment of Fort Lauderdale, Florida.

QwikLite is a rapid bioassay system that examines storm water drains, leachates of coatings, and marine sediments. It can be used to evaluate and monitor acute and sublethal chronic effects from exposure to a variety of toxicants. This test measures the toxicity of materials that are able to rapidly desorb from sediment particles. Bioluminescence inhibition is strongly correlated to inhibition of chlorophyll fluorescence and phototaxis behavior, which is quite serious for an organism restricted to the euphotic zone. A measurable reduction or inhibition in bioluminescence is an adverse effect. The toxic response is usually measured within 24 hours from the start of the test and can be conducted for a 4-day or 7-day test. The endpoint of the measurement is the IC50, which is simply a 50% reduction in light output when compared to control cells.

The system itself consists of a horizontally-mounted 2-inch diameter 8575 photomultiplier tube (PMT) attached to the QwikLite test chamber that is connected to the controller box via a combined power and signal cable. The top of the chest is removable and houses a small adjustable speed motor that drives a plastic stirrer. Quantification of 25 samples typically took less than 1 hour. Bioluminescence (light given off) versus the concentration of a particular metal or pore water (measured by Hach™ spectrophotometer or an Orion™ electrode) is graphed to give mean light outputs as a result. IC50 can be derived either by the graph or by statistical software.

In a study conducted using Navy Pier sites, a reduction in light from the bioluminescent oceanic dinoflagellate *Gonyaulax polyedra* following exposure to a toxicant was measured. *Gonyaulax polyedra* appears to be more sensitive to tributyltin, silver, copper sulfate, dibutyltin, lead, zinc, chromium, and

cadmium, than are mysid shrimp (*Mysidopsis bahia*) and is also more sensitive to sodium dodecyl sulfate than are inland silversides (*Menidia beryllina*), sheephead minnows (*Cyprinodon variegatus*), sea urchins (*Arbacia punctulata*), and mysid shrimp.

QwikLite was designed to be a cost-effective alternative to the Microtox™ assay. Microtox™ test systems are based on the reaction of a luminescent microorganism, *Vibrio fischeri*, formerly known as *Photobacterium phosphoreum*, a naturally occurring, nonpathogenic marine bacterium (gram negative rod), to contaminants present in a test sample. Further information about the QwikLite bioassay can be found on the MESO WWW site at <http://environ.spawar.navy.mil/Programs/MESO/Newsltr>.

Hard Copy Edition Of *Marine Environmental Update* To Be Discontinued

This is the last issue of the Marine Environmental Update that will be distributed as hard copy and e-mail formats. Beginning with the Volume FY99, Number 1, Winter 1998 issue (scheduled for publication in December 1998), the *Marine Environmental Update* will be published on the World Wide Web in keeping with the Navy's policy to reduce paper usage and operational expenditures. As a service to our readers, a "printer-friendly" (Adobe™ PDF format) version of each issue will be available for download from the MESO WWW server, in addition to the regular on-line edition.

The *Marine Environmental Update* will continue to be published on a quarterly basis, with unscheduled "special editions" posted according to need. Interested parties are urged to "bookmark" the MESO newsletter WWW site and check back periodically. The *Marine Environmental Update* can be accessed at: <http://environ.spawar.navy.mil/Programs/MESO/Newsltr>.

ABOUT THE MARINE ENVIRONMENTAL UPDATE

This newsletter is produced quarterly by the Marine Environmental Support Office (MESO), and is dedicated specifically to inform the Navy about marine environmental issues that may influence how the Navy conducts its operations. MESO is located at the Space and Naval Warfare Systems Center, San Diego, California. The mission of MESO is to provide Navy-wide technical and scientific support on marine environmental science, protection and compliance issues. This support covers a broad spectrum of activities, including routine requests for data and information, technical review and consultation, laboratory and field studies, comprehensive environmental assessments, and technology transfer. Significant developments in marine environmental law, policy, and scientific advancements will be included in the newsletter, along with references and points of contact for further information.

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